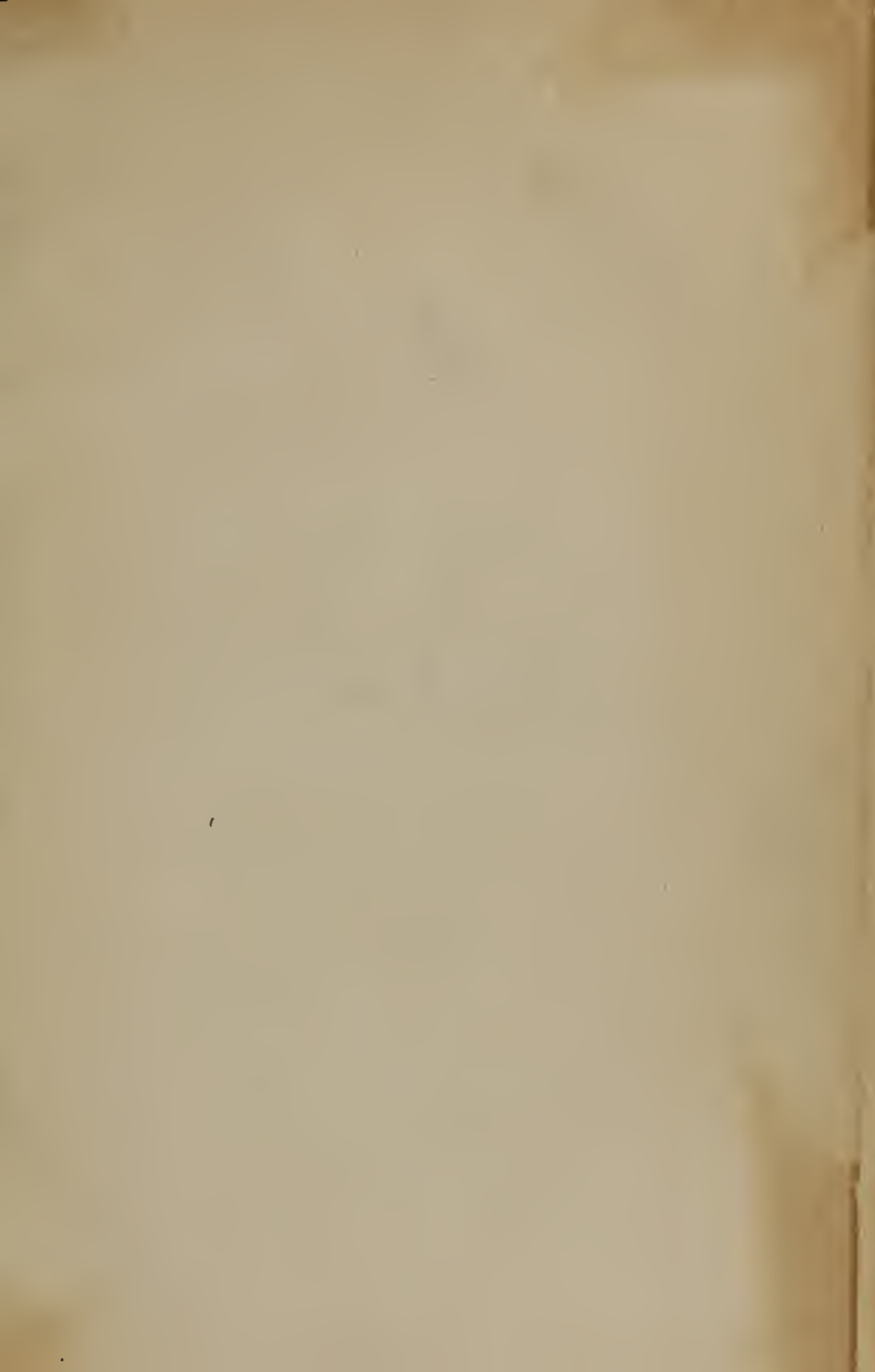


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SEA-SICKNESS:

ITS

CAUSE, NATURE, SYMPTOMS,
AND TREATMENT,

DERIVED FROM

EXPERIENCE AND STRICT OBSERVATION.

BY

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M. L. NELKEN, 181-261

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Dedicated

TO

EDWIN H. DAVIS, A.M., M.D.,

PROFESSOR IN THE NEW YORK MEDICAL COLLEGE,

AS A MARK OF

GREAT ESTEEM AND HIGH CONSIDERATION,

BY

THE AUTHOR.

INTRODUCTION.

IN casting a glance at the numerous and vast researches undertaken in modern times for the purpose of elucidating the most complicated questions of medical science,—in dwelling for a moment on the memoirs and monographs devoted to almost every disease offering a serious character, it is striking to remark how little interest has been comparatively taken in the study of sea-sickness—a disease dating back to the origin of navigation, that is, to the remotest antiquity, and which, according to universal testimony is a most distressing and painful malady.

The extraordinary increase of navigation in recent times in consequence of the enormous tide of emigration from Europe to North America, California, and Australia, has wrought little or no change in the matter. The nature of sea-sickness,

its intimate cause and treatment, are still veiled in the same doubt and obscurity.

Most extraordinary and contradictory opinions have been advanced within the last few years, in regard to all these particulars. Some consider sea-sickness a kind of miasma, or miasmatical intoxication. Others attribute it to sanguine congestion in the brain, provoked and entertained by the deranged centre of gravity. Still others look upon it as the result of centrifugal force called into action within the blood-vessels by the oscillation of the ship.

In vain do we look in all this for anything like a definitely settled or classic theory—every one being abandoned to his own experience, or the opinions of those of more or less standing in the profession.

This state of imperfection and controversy aroused in me long since an earnest desire to investigate the disease closely and minutely, at its very source and dominion. It was, therefore, with feelings of gratification that I availed myself of the opportunity offered to me in London for that purpose, in September, 1853, when Capt. J. G. Moore, appointed me surgeon on board his vessel, the "American Eagle," bound then for New

York, with 560 passengers of almost every age, and of both sexes.

We left London, September 10th, 1853, landed at New York, October 28th, 1853, had a rough and stormy passage, and plenty of sea-sickness.

As soon as we left London, I commenced directing my attention to all that was going on in our little sphere; kept a watchful eye upon each patient, observing and recording daily each symptom and incident having reference to the disease in question.

Prepossessed with no hypothetical theory on the subject, I confined my study to mere facts—keeping free from any tendency to seek explanation, and resolving not to adopt any opinion unless imposed by facts, or the result of actual and close observation.

In the following monograph, the reader will find a true and complete exposition of all the symptoms, progress, and course of sea-sickness, according to sex, age and constitution; and also its manifestation in some animals. Moreover, a rational account of its cause and nature; the best mode of treating the disease, and the most suitable regimen for sea-travelers; all equally derived from experience and strict observation. Finally, at the end

of the pamphlet, the reader is furnished with a summary sketch of all the articles or treatises heretofore published on this subject. How far I have succeeded in my endeavors to dispel vague theories, and throw some new light on the subject, the benevolent reader will judge for himself. In the mean time I shall esteem myself sufficiently compensated, if it merely benefits the suffering voyager, affords relief to the afflicted patient, and therefore be considered as a step in the right direction.

With regard to the circumstances under which I made these investigations, I am happy to remark that they were most favorable, and highly creditable to the Captain, and the owners of the vessel. A complete and well-selected stock of medicines was put at my disposal; our provisions were abundant, and of the best quality; cleaning, ventilation, and fumigation, were performed once a week under the supervision of the Captain, in person. Besides this, the greatest kindness and benevolence were exhibited by the Captain and crew in regard to each passenger.

It was undoubtedly owing to the extreme cleanliness of this vessel, so much insisted upon by Capt. Moore, and to the particularly good quality

of its provisions, that we remained exempt during the whole voyage from any epidemic, at a time when cholera was raging in many other vessels, and making in some of them a frightful number of victims. Not a single case of cholera presented itself during the whole passage. I thus had the fortune to observe sea-sickness in its most simple and uncomplicated form, and was much surprised on arriving at Quarantine in New York, to be asked by the Health Officer how many cholera cases we had on board? I simply replied, "We have had none." In concluding, I take pleasure in expressing my gratitude to Mr. E. N. Lawrence, one of our cabin passengers, a young Englishman of high intellect, and great sympathy for suffering humanity, who took deep interest in every patient, accompanied me in all my visits, and rendered me valuable aid in preparing and dispensing the medicines.

SYMPTOMATOLOGY.

SEA-SICKNESS does not always consist exclusively in vomiting, although such is the general belief.

It manifests itself to the attentive observer under four principal forms, viz.: vomiting, with more or less difficulty of respiration; vertigo; diarrhœa; and constipation. Each of these forms may present itself separately, to the exclusion of all the rest; and in the order of their relative frequency. Vomiting constitutes by far the most frequent form. Next to it, comes vertigo; then diarrhœa; and lastly, constipation.

More frequently, however, several of these symptoms combine with each other in the same case. Thus, vomiting is often attended with vertigo, or diarrhœa.

In all these forms, whether simple or compli-

cated, the tongue is constantly coated, the taste foul, the appetite wanting, and the mucous secretion in the mouth more or less increased, sometimes even to the extent of salivation. The patient generally longs for acids; and, in regard to food, generally likes what he disliked before, and *vice versâ*. The taste is thus much depraved.

The sickness of the stomach may exhibit itself in every degree, from slight nausea to the most distressing and painful vomiting. Diarrhœa and constipation (according to the predisposition of the patient) differ also in violence and obstinacy.

As to vertigo, it amounts, in some individuals, to such a degree as to prevent locomotion, or continuance in an erect position; compelling the patient to seek relief in a recumbent posture.

The number of persons going to sea, and remaining entirely free from sea-sickness, is comparatively small, and forms the exception. Among five hundred and sixty passengers, there were scarcely one hundred and fourteen who remained exempt from the disease. The latter were nearly all of strong, athletic constitutions, and fine muscular development; whilst those of a delicate constitution and nervous temperament, were the greatest sufferers. However, as an exception, I

have seen a few individuals of both sexes, who, notwithstanding a most evident nervous temperament and delicate constitution, remained unaffected; exhibiting no symptom of sea-sickness during the whole voyage.

Children under two years of age seem to enjoy a kind of immunity in this respect. At this period of life, I observed sea-sickness only as a very rare exception; but from two years onwards, they become more and more subject to it, so that those past seven or eight years of age labor under the same predisposition as adults, and seem to be governed by the same laws.

With regard to animals, I found that dogs, sheep, cows, and chickens, are, like the human race, equally liable to become sea-sick; at the same time, I observed hogs, ducks, and geese to be unaffected, and was informed that such was generally the case.

Sea-sickness usually makes its first appearance with the rising of the winds. It increases in direct proportion to their violence, and decreases as they subside; with the return of perfect calm it disappears, the sick recover, but to relapse anew as soon as the sea becomes rough again.

Many assert that one soon becomes accustomed

to sea-traveling, and that sea-sickness seldom lasts over a fortnight. But such opinion is at variance with my experience. For, according to my observation, people with a real predisposition to sea-sickness are liable to be affected every time they go to sea and encounter rough and stormy weather. I have known sailors subject to sea-sickness for many years, before they became inured to it, and could enjoy any thing like exemption.

Happily for the patient, the storm and rough sea seldom last more than a few days. They then subside into a calm of perhaps equal duration, which affords the patient time to rest and recover.

In this constant alternation of storm and calm, resides the hope of the sufferer; and without that, but few would be able to withstand a long voyage of continued tempestuous weather.

The sick usually feel better on deck, in the open air; and the horizontal position contributes much to their comfort.

This malady, if too intense, and persisting for a long time, especially in feeble constitutions, may at length assume a typhoid condition, and carry off the patient.

Here I might readily end all I have to say in reference to the symptoms, and usual course of the disease in question. But in order to be

complete, and to omit nothing worthy of consideration, I have resolved to add a few remarks in regard to some morbid conditions, prevailing also on shipboard; the one being exclusively the result of sea-sickness, the others quite independent of it. As such, I deem it proper to mention prolapsus of the rectum, scurvy, and typhus.

The first is of frequent occurrence at sea, particularly with people predisposed to it, and owes its existence to the frequency of diarrhoea and constipation.

As to scurvy, it is generally met with only in sea voyages of long duration. It manifests itself under the following forms, viz. general prostration, petechiæ, or hæmorrhage; and appears, in some cases, to be merely the consequence of the embarrassment in the digestive and respiratory organs; whilst in others, it seems to derive its cause from imperfect ventilation, corrupted food, or scarcity of provisions.

With regard to typhus, its appearance on board the ship, if not imported from other localities, is in every respect similar to that in crowded prisons and hospitals. It develops itself with preference in ill-ventilated and crowded vessels; is favored by filth, and foul provisions; exhibits the same symptoms, and requires the same treatment.

CAUSE AND NATURE OF SEA-SICKNESS.

UPON a careful study of all the symptoms previously detailed, we feel justified in deducing the following conclusion, viz.—That sea-sickness owes its origin entirely to the tossing and rolling of the vessel. Indeed, this oscillating motion in every direction—forwards and backwards, from side to side, and bounding up and down at the mercy of the waves—is sufficient in itself, without other cause, to produce this distressing malady.

As proof of this, we need only recall to mind the facts, that the sickness does not generally commence until the rising of the winds; that it increases with their violence, and diminishes as they decline; that it disappears almost entirely with the return of perfect calm, but to reappear as certainly as the winds rise again.

This constant play of increase and decrease of the disease, in close connection and direct proportion to the rise, violence, and cessation of the winds, is too apparent not to strike the most superficial observer with the evident relation of cause and effect.

As to the *modus operandi* by which this cause

acts upon the economy to produce sea-sickness, I came to the following conclusion, which seems to me to be the most probable, viz.—That the long-continued and violent motion of the ship communicates its disturbing influence simultaneously to all the viscera and organs contained within the abdomen, thorax, cranium and the spinal column,—that according to the idiosyncrasy—in other words, to the peculiar structure and impressibility of the ganglion, pneumogastric, and cerebro-spinal systems of nerves in different individuals—various symptoms manifest themselves.

Thus, with some it is the cerebro-spinal nervous system which seems most affected. The patient then suffers chiefly from dizziness. With others it is the pneumogastric nerves which appear to be most impressed, and we then observe vomiting and difficulty of respiration as the consequence of their derangement. Again, with others, the effects of the general disturbance seem to bear particularly upon the ganglion nerves, and result either in dyspepsia, diarrhœa, or constipation.

Finally, several of these various systems of nerves may be simultaneously and equally affected ; and sea-sickness then develops itself (as it has been seen in the symptomatology) under its combined or complicated forms.

T R E A T M E N T .

LITTLE or no difficulty is encountered in removing diarrhœa or constipation. The first generally yields upon the use of mucilaginous and aromatic drinks—or in obstinate cases, by resorting to opiates ; whilst the latter is commonly disposed of by the administration of various cathartics, in accordance with the tenacity of the disease, and the constitution of the patient.

But it is different with regard to vertigo and vomiting, as they frequently resist what would appear to be the most appropriate treatment. Aromatic or effervescent drinks, and even ether, though highly beneficial in cases of common sickness of the stomach, prove here of little or no avail. The same negative result takes place with many other remedies, so that for a time, I looked upon it as doubtful whether it was at all amenable to treatment ; especially, as long as the cause which

produced it (that is the motion of the vessel) continues its action.

However, after frequently observing that the stomach, in most of the patients, is momentarily quieted upon the ingestion of food, and that sleep affords them relief, I finally determined upon the possibility of an efficient treatment. I then directed my attention in particular upon the whole series of narcotics, and selected morphine as the most suitable, and used it subsequently in many cases, both for giddiness and vomiting, with entire success. I gave it in the dose of half a grain twice a day. In severe cases, and with some individuals, the dose must be increased. But in such cases great circumspection and care are required in its management.

The relief afforded to the patient from the use of this narcotic, does not generally last more than from twelve to twenty-four hours. With the return of the symptoms (giddiness and vomiting), the morphine must be resumed again.

Chloroform, used internally, does not differ materially in its action from ether, and, like it, is but of limited utility.

Strychnine, administered in very small quantities and with the necessary caution, cannot be

denied a certain beneficial influence upon the stomach in some cases of vomiting ; but it bears no comparison in this respect with morphine, and must be regarded as inferior.

The *position* of the patient deserves equally to be taken into consideration—the horizontal proving much more agreeable than the erect posture, as it better supports the stomach, intestines, and all other internal viscera, and prevents, thereby, to a certain degree their too great disturbance by the oscillation of the vessel.

For the same reason, an abdominal supporter made in a manner to cover the whole abdomen, and to offer a certain degree of resistance, proves also highly serviceable.

R E G I M E N .

ABSTINENCE from eating and drinking, recommended by some, is not only useless, but pernicious, particularly in long voyages. For, the patient becomes thereby more and more exhausted, anæmic, and cachectic, and may at length succumb of inanition.

Too great an indulgence in food is equally obnoxious; for it is evident that the stomach in such a diseased condition, is not able to digest a large quantity of nourishment, and derives only inconvenience from it.

A generous diet, that is, substantial and succulent food, easy of digestion, with the addition of a little brandy or wine, according to the habit of the patient, is undoubtedly the most befitting and useful. Such a regimen is nourishing and strengthening, does not oppress the stomach, but acts somewhat as a soothing or sedative remedy; in other

words, *settles* the stomach. Sweetened water, with the addition of lemon-juice, or a little citric or tartaric acid, forms a grateful beverage, much enjoyed by the sea-sick. Remaining in the open air on deck, where the shock of the vessel is somewhat modified, is of undeniable service.

The fact of there being plenty of vessels sailing on the seas, provided with no medical attendance at all, suggested to me the idea of annexing here a certain number of medicinal formulas adapted to each form of sea-sickness in particular, such as will, I hope, in certain cases, be consulted with advantage even by the profession, and above all be particularly useful to the patient, in supplying for him the want of a professional treatment.

This being my design, the reader will easily remark that, in putting up these formulas, I purposely avoided every complication, restricting myself to medicines in regard to their medical properties the most efficient, and in regard to form the most simple and practical, such as, I dare say, will be easily prepared, easily preserved, and above all easily managed, as well by captains as by the patient himself.

FORMULARY.

LEMONADE, or, as a substitute, a few grains of tartaric or citric acid, added to a tumbler of sweetened water; sufficient to make it agreeably sour, to be taken *ad libitum*, as a grateful beverage to satisfy the longing for acids.

For Uneasiness in the Stomach, Intestines, and Dyspepsia.

1. Tea, or pastilles of peppermint.
2. ℞ Ether. sulphur., spirit vin. rtf.; $\overline{\text{aa}}$ \mathfrak{z} i. M. D.
S. A few drops upon sugar.
3. ℞ Rad. gentian., lig. quassiae; $\overline{\text{aa}}$ \mathfrak{z} iv.; cort. aurant.; rad. columbo; $\overline{\text{aa}}$ \mathfrak{z} i. To be soaked in a pint and a half of good brandy, 6 days, and then filtered. S.
To be taken from one to two wine glasses a day.

For Vomiting and Dizziness.

1. ℞ Morphii sulphas, gr. xvi.; solve in aq. destill.

℥ i. M. D. & S. To be taken, 10 drops three times a day.

2. ℞ Chloroform ℥ ii ℥; vitell. ovi un.; aq. commun. ℥ vii.; syrup sacchar. ℥ i. M. D. & S. One table spoonful to be taken every hour.

3. ℞ Strychnin. gr. ii.; solve in spirit vin. rtf. ℥ ii. M. D. & S. To be taken, 15 drops twice a day.

For Diarrhœa.

℞ Tinct. opii spl. ℥ i. D. et S. Ten drops in a cupful of peppermint, althea, or flax-seed tea, three times a day.

For Constipation.

1. ℞ Acid. tartar. ℥ i. (in blue paper); tartrat. potass. et sod. ℥ i ℥; bicarb. sodæ ℥ i. (in white paper). D. et S. To be mixed in water, and taken whilst effervescing. N. B. ℥ i. of glauber or epsom salt may be substituted for tartrate of potassæ et sodæ.

2. ℞ Pulver. rhei. ℥ i ℥; hydrarg. submuriat gr. v. M. D. et S. To be taken at once, in a little molasses, as a mild and soft purgative.

3. ℞ Pulver. scammon alep. ℥ i. D. et S. To be taken at once, in some molasses, with equal effect, and for the same purpose.

Tonic Purgative in Liquid Form.

℞ Tinct. sennæ, tinct. rhei.; aa ℥ ii. M. D. et S.

Take a table spoonful in a cup of peppermint tea, every ten minutes; from three to four times.

Drastic Pills.

℞ Alöes socotrin.; gummi guttæ; $\overline{\text{aa}}$ 3 ii.; syrup spl. q. s. ut fiant pilul. 60. D. et S. To be taken from two to six.

For Scurvy.

1. ℞ Quin. sulph., 3 i.; ferr. tart. 3 iii.; syrup gentian. q. s. ut fiant pilul. 60. D. et S. To be taken, two pills three times a day.

2. Iron, in liquid form, for the same purpose. ℞ Ferri et potass. tartras, \mathfrak{D} iv.; to be dissolved in two pints of white wine or water, and taken in four days by the glassful. At the same time the patient must be put upon a generous diet, and acidulous drinks.

N. B.—The above formulas are intended for adults. With regard to children, the dose has naturally to be modified, according to their age.

HISTORY AND LITERATURE OF SEA-SICKNESS.

ACCORDING to the preliminary remarks in the Introduction, the reader will now observe that the number of treatises on sea-sickness is indeed very limited.

The high and valuable information we used to derive in nearly all other diseases, from the immortal ancient authors of medicine, is vainly looked for, with regard to the disease in question. We inherit from antiquity, no competent work on the subject.

Neither Galen nor Hippocrates found it worth while to write upon, or had no fit opportunity to study the subject. The latter, in recommending exercise for aiding the effects of hellebore, merely alludes to it in saying, "*Declarat autem etiam navigatio, quod motus turbat corpora.*"—Aphoris, sect. iv. 14. Seneca himself experienced this malady, but had no vomiting. The same author relates also that Cicero, in flying to sea to escape decapita-

tion, decreed on him by Mark Anthony, suffered so severely from sea-sickness that he preferred to return to Gaeta, and resign himself to death, rather than expose himself further to this suffering. Plutarch is the only one in ancient times, who, in his *αἰτίας πνσίχαϊς*, art. 11, wrote more particularly on this malady. He examines the reason why sea-sickness occurs particularly at sea, and not on rivers; and comes to the conclusion that it is owing to the smell of the sea, and the fears of the patient!

With regard to modern times, the disease has in fact been studied by various authors, but it is surprising to notice that nearly all consume their greatest efforts and ingenuity in explaining the cause and nature of sea-sickness, paying proportionally but little attention to its real history.

Thus, we are furnished liberally with quite a number of hypotheses and theories, but possess scarcely any substantial practical work on the subject.

This wrong tendency has already been deservedly adverted to by the clever and clear-sighted Kerauderen, and censured by him with great propriety.

In consequence of the plan adopted in writing this monograph, I would now, in concluding, have

but to add a simple list of the treatises and articles published to this day on the matter. But, the great diversity of opinions in reference to the cause of sea-sickness, their fancifulness and oddity, I dare say in many cases might, as a matter of curiosity, excite in the reader a desire to become acquainted with them. In order, therefore, to save him the trouble of tedious reference and research, I subjoin here, moreover, a brief resumé of all those theories.

VARIOUS OPINIONS WITH REGARD TO THE CAUSE AND NATURE OF SEA-SICKNESS.

I. It derives its existence from a relation of sympathy between the brain and peripheral nerves. (Gilchrist.)

II. It is owing to irritation of the optic nerves, caused by the apparent vacillation of everything around the vessel. (Barru.)

III. It is due to sanguine congestion of the brain, brought on by a deranged center of gravity during the pitching forward of the vessel. (Wolleston.)

IV. It is attributed to miasmatic intoxication. (Lemanas.)

V. It is accounted for, by sanguine depletion in the brain, caused by a centrifugal force called into action within the blood vessels, in consequence of the oscillation of the ship. (Pellarin.)

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APPENDIX.

THE following article is taken from the "New York Daily Times."

EMIGRATION PASSENGER LAWS.

THE attention of the various European governments, as well as those of the United States, has been directed with more or less earnestness, for over forty years, to the necessity of ameliorating the condition of emigrants who have been conveyed by passenger ships to and from the two Continents; but it has required the experience of that long period to perfect legislation upon the subject. During the first quarter of the present century—indeed until within about ten years—the influence of shipowners was so entirely enlisted in behalf of a selfish, murderous system of transport, and they possessed so exclusively the access to the ear of men in authority, that it was with the greatest difficulty, and in opposition, frequently, to nearly insurmountable obstacles, that any interference with their interests could be effected. Fortunately, a few years ago, a simultaneous movement began among benevolent commercial men—including even some unusually disinterested owners of emigrant vessels—in England, France, and the United States, for the benefit of the poor passenger; and various individuals undertook to investigate and apply a remedy to the gross abuses which had caused such vast numbers of persons to be swept into the grave, during the few short weeks of transit across the ocean. The result of their efforts, aided greatly in this country by the present Secretary of the Treasury, has been a gradual advancement to the existing laws on the subject, which are nearly as perfect, in most respects, as the case requires.

The first act of Congress, regulating passenger ships and

vessels owned in the United States, was passed on the 2d March, 1819. Its provisions were confined to a meager enactment concerning the quantity of water and provisions to be carried on board, and to prohibiting a greater number of passengers from being taken than two for every five tons of such ship or vessel. This act remained in force until 1847, when, for the first time, a law was made regulating the amount of space on board of vessels which should be dedicated to passengers. It was approved on the 22d February of the latter year; and enacted that fourteen clear superficial feet of deck should be allotted to each passenger on vessels passing outside the tropics, and twenty feet on vessels within the tropics. No requirement, however, was made in this law with regard to the distance between decks; in consequence of which omission a bill was introduced into Congress the following year, which passed and became a law on the 17th May, 1848, enacting that when the height or distance between the decks of vessels should be less than six, and not less than five feet, sixteen, instead of fourteen, clear superficial feet of deck should be allowed to each passenger, and that if the distance were less than five feet, twenty-two such clear superficial feet should be allotted. The same law made provision, for the first time, for a somewhat improved ventilation of the miserable prisons in which passengers had been previously confined.

After the passage of the law of 1848, and a supplementary extension of its provisions the following year, it was believed that no further legislation would be requisite, and shipowners confidently asserted that all had been done which was possible, under any circumstances, for the benefit of emigrants. This was soon perceived to be a delusion. The mortality among passengers in the steerage certainly decreased, but it was soon found to be altogether greater than had been supposed. A want of proportion was observed between the number of passengers and the tonnage of the vessel, even when the literal requirements of the law were fulfilled; and one of the largest shipowners in the country declared also that so small a space as five feet between the decks of the vessels ought never to be permitted, and could not

be compensated for by an additional number of superficial feet of deck. The consequence of these complaints was a renewed investigation of the subject, at the instance of the Secretary of the Treasury, Mr. Guthrie, and the introduction of a bill into the Senate by Senator Fish, of this State, which is the sum of legislation, up to the present time, concerning the carriage of passengers. It was approved by the President on the 3d of March, 1855; and the table, with which we have been furnished below, abundantly demonstrates its results.

Mr. Fish's bill provides that no American vessel shall convey a greater number of passengers than in proportion of one to every two tons of such vessel; that on the main and poop decks or platforms, and in the deck-houses of ships, not more than one passenger for each sixteen clear superficial feet of deck, and on the lower deck eighteen such clear superficial feet shall be allotted; but also, that no "passenger shall be carried upon any deck or platform, where the height or distance is less than six feet." This last clause is the prominent feature of difference between it and all previous enactments; although abundant and excellent regulations are made with respect to ventilation, provisions, and the security of the emigrants. It fixes a maximum number of passengers, by restricting their number to the proportion of one to every two tons of the vessel's measurement; so that, though it may afford clear spaces, of the dimensions indicated, for a greater number than she is permitted to carry, they may not be used without violation of the law.

The following tables give the mortality on board of all vessels arriving at this port during the last year of the operation of the law of 1847-8, as compared with the same for six months under the last year, which went into operation on the 1st June last:—

1854.	No. of Vessels ex'd.	Passengers.	Deaths.	
			Adults.	Infants.
August.	51	15,130	31	81
September.	60	18,768	56	
October.	120	39,171	219	273
November.	43	15,143	195	199
December.	66	19,520	188	208

1855.	No. of Vessels ex'd.	Passengers.	Deaths.	
			Adults.	Infants.
January.....	24	6,751	9	47
February.....	32	5,896	14	27
March.....	16	2,180	4	4
April.....	21	7,271	6	8
And up to August 1.....	86	27,685	21	106
<hr/>				
Total.....	519	157,517	743	1,039
Average number of passengers in each vessel.....			284	
Average number of deaths in each vessel, nearly.....			3 $\frac{1}{2}$	

New law went into effect May 3. Vessels began to arrive in June.

	Number of Vessels.	Number of Passengers.	Deaths.	
			Adults.	Infants.
To August 1.....	61	17,820	9	28
August.....	33	9,784	2	16
September.....	51	13,599	25	19
October.....	38	9,663	6	18
November.....	21	5,525	1	5
December.....	44	6,057	15	39
<hr/>				
Total.....	248	65,488	58	165
				58
<hr/>				
Total deaths.....			223	
Average number of passengers in each vessel.....			264	
Average number of deaths to each vessel, less than.....			1	

It is to be observed, that although the decrease of mortality under the new law is here shown to be but one to three and a half of the old law, vessels are included in the latter table on board of which numbers died of cholera, thereby increasing the average of death of the whole number of vessels. If the greater number of infants is considered, many of them in a sickly state, who are brought to this country by their parents; and also the abject poverty and helplessness of many emigrants, the present sanitary provisions on board of American ships must be considered highly satisfactory, and those persevering individuals who have brought our legislation to its present state deserve gratitude for their success.

